



# INFOMAT

Januar 2018

## NYTT MERSENNE PRIMTALL FUNNET!

**$2^{77,232,917} - 1$**

Rett over nyttår ble det annonsert at det 50. Mersenne-primtallet er funnet. Tallet har ca. 23 millioner siffer.

Mersenne-primtal er primtall på formen  $M_q = 2^q - 1$ , der  $q$  er et primtall. De fire første Mersenne-primtallene,  $M_2=3$ ,  $M_3=7$ ,  $M_5=31$  og  $M_7=127$  var kjent allerede i antikken. Det neste tallet i denne rekken,  $2^{11}-1=2047=23 \times 89$  er ikke et primtall.



Marin Mersenne

Det femte Mersenne-primtallet  $M_{13} = 8191$  ble oppdaget av en anonym kilde før 1461, og det sjette og sjuende av Pietro Cataldi i 1588. Så gikk det nesten 200 år før Euler verifiserte at  $M_{31}$  er et primtall. Etter dette har det med ujevne mellomrom dukket opp stadig nye Mersenne-primtall.

Et anekdotisk funn ble gjort av Frank Nelson Cole. Han presenterte resultatet sitt under en forelesning i 1903. Uten å si et ord gikk han til tavlen og skrev opp 2 opphøyd i 67 og trakk fra 1. På den andre siden av tavlen multipliserte han sammen  $193,707,721 \times 761,838,257,287$  og fikk samme tall. Han gikk og satte seg (til salens applaus), fortsatt uten å si noe. Senere fortalte han at det hadde tatt han "hver søndag i 3 år" å komme fram til resultatet. Så  $M_{67}$  er ikke et primtall.

Letingen etter Mersenne-primtall ble revolusjonert med datamaskinenes inntog. I 1952 ble  $M_{521}$  funnet og så gikk det slag i slag. Først veldig hyppig, men etter hvert stoppet det gradvis opp. De siste tre, fram til årets funn av nummer 50, ble gjort i 2013, 2016 og 2018.

INFOMAT kommer ut med 11 nummer i året og gis ut av Norsk Matematisk Forening. Deadline for neste utgave er alltid den 15. i neste måned. Stoff til INFOMAT sendes til

**arnebs at math.uio.no**

Foreningen har hjemmeside <http://www.matematikkforeningen.no/>

Ansvarlig redaktør er Arne B. Sletsjøe, Universitetet i Oslo.

# ARRANGEMENTER

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## Matematisk kalender

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**2018:**

**Mars:**

20. *Abelpriskunngjøring*, Oslo

**Mai:**

22. *Abelprisutdeling*, Oslo

23. *Abelforesningene*, Oslo

29.-30. *Topologimøte*, Oslo

**Juni:**

18.-22. *Nordfjordeid Summer school 2018: Combinatorics and Hodge theory*, Nordfjordeid

**Desember:**

6.-8. *Enumeration and Moduli*, Oslo

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## TOPOLOGIMØTE, Oslo, 29.-30. mai 2018

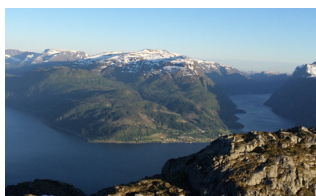
On 29-30 May 2018 there will be a topology meeting at the University of Oslo covering a broad range of topics including topological Hochschild homology, motivic homotopy theory, symplectic geometry, and low-dimensional geometry. So far, the meeting will feature lectures by: **Cecilia Karlsson, Raphael Zentner, Emanuele Dotto, Kristian Moi, Martin Frankland, Grigory Garkusha.**

Please visit the meeting's website

<https://sites.google.com/site/topologymeetinguio/> for more information

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## NORDFJORDEID SUMMER SCHOOL 2018: COMBINATORICS AND HODGE THEORY, Nordfjordeid, 18.-22. juni 2018



The aim of the summer school is to provide an introduction to the recent advances in combinatorics and representation theory and in particular

their interaction with algebraic geometry. The school is aimed at phd students (as well as advanced master students and early postdocs) with a general

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background in algebra, and with interests in algebra, geometry or topology. There will be three lecture series and extensive problem sessions.

Speakers:

**Petter Brändén** (KTH)

**June Huh** (IAS/Princeton)

**Nicholas Proudfoot** (Oregon)

For more information, see the website: <http://www.mn.uio.no/math/english/research/groups/algebra/events/conferences/nordfjordeid2018/index.html>

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## ENUMERATION AND MODULI, Oslo 6.-8. desember 2018

A conference in algebraic geometry on the occasion of Geir Ellingsrud's 70th birthday.

For further information, see: <http://www.mn.uio.no/math/english/research/groups/algebra/events/conferences/Enumerationandmoduli/index.html>



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## Nye doktorgrader

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**Magnus Hellström-Finnsen** forsvarte 8. januar 2018 sin avhandling *Hochschild cohomology, monoidal categories and quantum complete intersections* for graden Ph.D. ved NTNU. Hovedveileder har vært Prof. Petter A. Bergh, og bi-veileder Prof. Steffen Oppermann.

**Sammendrag:**

This thesis consists of three parts. Two of the parts are devoted to understanding invariants of monoids in monoidal categories, we study Hochschild cohomology and the prime spectrum. The remaining part of the three is devoted to determine the algebra structure of the Hochschild cohomology of some quantum complete intersections.

Monoidal categories were independently discov-

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ered by Bénabou and MacLane in the early 1960's, and give an axiomatic framework describing tensor-like structures in categories. Hochschild initiated the study of cohomology theory of algebras in 1945. Later, Gerstenhaber found that the Hochschild cohomology ring had even more structure, in particular he proved that the Hochschild cohomology ring is graded-commutative. The objective with the first article is unite these two notions, i.e. define Hochschild cohomology for monoids in monoidal categories. Moreover we provide similar interpretations for the lower dimensional cohomology groups as for the classical case and prove that the cohomology ring is graded-commutative.

The second article, which is a joint work with Karin Erdmann (University of Oxford). The study of quantum complete intersections was initiated by Manin in 1987, and the have provided examples answering to homological conjectures and questions. In this article we study Hochschild cohomology of some quantum complete intersections; we determine the ring structure of the even Hochschild cohomology (modulo the ideal of homogeneous nilpotent elements). We compute the algebra structure of the even Hochschild cohomology (modulo the largest homogeneous nilpotent ideal) and show that it is  $\mathbf{Z}_2$ -graded.

The last article is inspired by Balmer's article on prime spectrum for triangulated categories from 2005. In contrast ,we look at symmetric monoidal categories, without considering anything about the triangulated structure. We define the prime spectrum of such category. Further we define support data and prove that the prime spectrum has the universal property of being final. Finally, we classify radical thick tensor ideals with certain subsets of the spectrum, namely those that are intersections of closed sets having quasi compact complements.

## Nyheter

### MEDLEMSKAP I EMS

Norsk Matematisk Forening oppfordrer sterkt alle sine medlemmer om å melde seg inn i EMS, hvor man får rabatt. For innmelding/fornyning av medlemskapet, gå til

[http://www.euro-math-soc.eu/ems\\_payment\\_new/ems\\_payment\\_new.html](http://www.euro-math-soc.eu/ems_payment_new/ems_payment_new.html)

Når du betaler, ha i mente følgende melding fra presi-

dent Exner og kasserer Gyllenberg i EMS:

The EMS Committee for Developing Countries (CDC) has an important mission in supporting mathematics research and education in developing countries (<http://euro-math-soc.eu/committee/developing-countries>). It has been a tradition to ask individual members to contribute to the activities of CDC with a donation of at least 10 EUR when they pay their annual fees to EMS. This option of donating is implemented in the electronic system of EMS. However, most individual members pay their annual fees to EMS in connection with their payment of the fees to their national member society. We should therefore be grateful if you could encourage your members to give a small donation to CDC each time they pay their annual fees to EMS through your society.



## Utlysninger

### LEDIG STILLING VED OSLOMET

The Department of Computer Science at the Faculty of Technology, Art and Design at OsloMet has a vacancy for a professor/associate professor in Mathematics.

We are looking for a candidate with a talent and a passion for teaching, research and innovation. Candidates will be expected to have conducted extensive research in functional analysis or other fields related to quantum information theory. The research should be reflected in an extensive publication list and high impact. It is an advantage if the candidate can document solid competence within operator algebras with a specialization in quantum groups. Relevance to quantum information is also valuable in this context.

For more information, see: <https://hioa.mynetworkglobal.com/en/what:job/jobID:186443/iframeEmbedded:0/where:4>

### CALLING OUTSTANDING YOUNG RESEARCHERS!

The application process for the 6th Heidelberg Laureate Forum closes in 3 weeks, **February 9, 2018**.

Young researchers in computer science and mathematics from all over the world can apply for one of the 200 coveted spots to participate in the Heidelberg Laureate Forum (HLF), an annual networking event. The HLF offers all accepted young researchers the great opportunity to personally interact with the laureates of the most prestigious prizes in the fields of mathematics and computer science. For one week, the recipients of the Abel Prize, the ACM A.M. Turing Award, the ACM Prize for Computing, the Fields Medal, and the Nevanlinna Prize engage in a cross-generational scientific dialogue with young researchers in Heidelberg, Germany.

The application period for the 6th HLF runs from November 6, 2017 until February 9, 2018. Young

researchers at all phases of their careers (undergraduate, graduate PhD or postdoc) are encouraged to complete and submit their applications by February 9 (midnight at the dateline) via the following link:

<http://application.heidelberg-laureate-forum.org>

The 6th HLF will take place from September 23 to 28, 2018 (with young researcher registration on September 22). This prominent, versatile event combines scientific, social and outreach activities in a unique atmosphere, fueled by comprehensive exchange and scientific inspiration. Laureate lectures, young researcher workshops and a structure welcoming unfettered discussions are the elements that compose the Forum's platform.

All applications that are completed and submitted by the deadline are meticulously reviewed by an international committee of experts to ensure that only the most qualified candidates are invited. There are 100 spaces available for each discipline of mathematics and computer science. All applicants will be notified by the end of April 2018 whether or not they will be invited.

For questions regarding requirements and the application process, please contact Young Researchers Relations at: [yr@heidelberg-laureate-forum.org](mailto:yr@heidelberg-laureate-forum.org)

For more information, please visit: [www.heidelberg-laureate-forum.org](http://www.heidelberg-laureate-forum.org)

